Descriptive report of patent of model of utility of the Anti-Damage Contact Lens Case

Amongst the five senses, the one that mankind has most emphasized and valued is that of vision.

To see is something sublime. The possibility of not seeing is something deplorable and extremely limiting to a human being. For a long time, man has been searching to correct and adapt his conditions to enjoy perfect vision, or to endow it with greater resources. In this sense, diverse instruments have been invented, adapted and perfectioned, for example spectacles, field-glasses and spyglasses, microscopes, lens, etc.

With regard to contact lens, the first concepts date back to the Renaissance period; as conceived by Leonardo da Vinci (1452-1519) and René Descartes (1596-1650).

In reality the first definitive description of a contact lens was published between 1827 and 1845, by the English astronomer John Frederick William Herschell, which describes a glass capsule full of gel functioning as a posterior refractive surface.

In 1886, Xavier Galezowski created the first therapeutic contact lens. This was a gelatin square soaked in a solution of mercury saline. The square was kept in place through a rubber cover affixed to the cornea and whose function was to aid in the cure and reduction of infections arising from cataract surgery. In the year of 1888, important advancements were observed. In France, Eugene Kalt developed the first contact lens for keratoconus (a disease that alters the original topography of the cornea) in the

Paris Academy of Medicine. An important brief of the theory of contact lenses was published in a PHD dissertation by August Müller for the University of Kiel, Germany, in 1889. Müller described his concept of a cornea lens with a corrective prescription in its anterior surface and was the first to use the term cornea lens. He postulated that the lens would adhere to the surface of the cornea due to capillary attraction of the tear sac, which he described as possessing an important metabolic function and which is necessary for adequate tear circulation - a use well-suited for this contact lens.

The difficulties in the manufacturing of contact lenses were associated with the inability of the eye to adapt itself to glass lenses. From the middle of 1890 until close to 1912, progress was slow.

However by the 1930s, Joseph Dallos, of Hungary reached various notable improvements in the development of contact lenses. Dallos discovered that lenses which permitted blinking movements were better tolerated than more constricted lenses. He deduced that this tolerance owed itself to the fact that loose or unfixed lenses permitted greater tear circulation.

In 1938 Müller and Obrig utilized for the first time polymethyl methacrylate (PMMA) - a combination of methyl methacrylate monomers and a cornea lens rendered viable because the new material was much lighter than glass, easier to be worked on, and more malleable to the tissues of the eye.

In the 50s, it was discovered that lenses could be manufactured utilizing polymerized hydroxyethyl methacrylate (HEMA), the precursor to today's

hydrophilic lenses, but unfortunately these first lenses had little acceptance because of their fragility and heaviness. However the evolution of the contact lens continued after the invention of amachine that could produce contact lenses through a process of spin casting. In 1966 a patent for this process was purchased by Baush & Lomb, which conferred great development in this area.

In the 1970s initiatives were made to produce lenses that combined the ability of the PMMA to correct stigmatism with the quality of gas permeability associated with hydrophilic contacts. The result was the introduction in 1978 of rigid gas permeable lenses (RGPs) of cellulose acetate butyrate (CAB). This material had good gas permeability but stopped being utilized due to its lack of reproducibility, instability, and its affinity for creating lipid deposits. In the 1980s this clinical problem was resolved with the development of another material derived by the copolymerization of PMMA and siloxanes (silicone lenses) and with the addition of fluoride monomers to silicone lenses created as fluorocarbon lenses. This increased their permeability to oxygen, making possible the prolonged use of the RGPs introduced in 1985.

Currently there exist two principal types of lenses, soft and hard. Soft contact lenses absorb water, are flexible and plastic, and adhere to the surface of the cornea. Soft lenses in their varied forms, are capable of correcting myopia, stigmatism (toric lenses), presbyopia (bifocal lenses) and hyperopia. We can classify soft lenses as follows: disposable

soft lenses used daily and replaced periodically; conventional lenses, with an average longevity of one year, utilizable for daily or extended wear; colored lenses, utilizable for daily or extended use, or disposable, which in addition to changing eye color, can correct myopia and stigmatism; aesthetic lenses which serve to cover defects of the iris or pupil arising from infectious diseases or traumas to the eyes that cause eyes to be whitened or blemished; and removable bifocal and toric lenses used for daily or extended wear, or disposable.

Hard contact lenses are hard lenses that are not absorbent to water. Within this category, with the evolution of polymers (described previously) we can include RGP (rigid gas permeable) lenses which are lenses that absorb oxygen and classified by their degree of absorption. Currently there exist RGP substances that allow an eye with a contact lens to absorb 18% of oxygen while an eye without a contact lens absorbs 21%. In this category, today will also benefit from hybrid materials whose chemical composition contains a small percentage of material which are used for the manufacture of soft lenses. This material gives them greater comfort due to superior hydrogenation as compared to harder materials, while maintaining the same characteristics. With RGP lenses we can correct all visual problems corrected by soft lenses, with little difference in their personal appearance. Like soft lenses, they can be used for daily or extended wear, with exception of

disposable, colored or aesthetic lenses that are only manufactured as soft lenses..

All types of contact lenses possess points where dirt, bacteria, chemical products and eye secretion can accumulate themselves. These deposits begin to form the moment lenses are placed on the eyes. Besides not being able to see, they can cause eye infections or permanent damage, hence correct care for contact lenses is important for comfort and long-term visual acuity. The optimal use of contact lenses depends on following regular procedures of cleaning, disinfecting, neutralization, removal of proteins and rinsing. In the world market national and multinational pharmaceutical laboratories produce solutions specific to every one of these stages of hygiene.

The search for new solutions of greater efficacy in the cleaning and conservation of contact lenses advanced in parallel with the rise of new aims to increase permeability to oxygen, comfort for users, and resistance to the adherence of proteins. Cleaning solutions are also differentiated amongst soft and gas-absorbing lenses. For each stage of hygiene there exists a specific product and today we find ourselves with multi-purpose solutions that according to the manufacturers, allege to take care of all stages of cleaning.

Inserted into this context is an ophthalmologist in charge of indication, counter-indication, adaptation and orientation of a person interested in acquiring contact lenses. It is their responsibility to

prescribe the most appropriate lens for each kind of visual correction needed as well indicate the best system of hygiene for the prescribed lenses.

To affirm the relevance of the issue of contact lenses to Ophthalmology, The Brazilian Council of Ophthalmology (CBO) founded the Brazilian Society of Contact Lenses, Cornea Disease and Eye Examinations (SOBLEC) with the goal of advancing the use of contact lenses, preparing ophthalmologists to exercise this function with knowledge and security, and helping to promote that its members continue to stay up-to-date with advancements in the areas of contact lenses, cornea disease.

Two million Brazilian users of contact lenses have at their disposal a productive network of extremely high technological complexity and aggregate knowledge.

Today contact lenses are a sub-specialization in Ophthalmology, with an ever-increasing number of ophthalmologists that dedicate themselves exclusively to contact lenses.

However, despite all the clear progress during recent years (as much in finishing materials (polymers) as in cleaning solutions) contact lenses still find themselves having one serious problem. This is with regard to their storage, and what is known as the "lens case".

We can describe the lens case as a plastic receptacle with two independent cavities with screwable caps, interconnected at the base. Each cavity has a capacity measured at 6 ml. Excepting a retouched visual appearance from time to time, this case design has remained virtually the same for decades. The case

is an indispensable accessory for all types of contact lenses because within its interior all stages of cleaning and hygiene are processed.

Paradoxically, it is in this same case that thousands of contact lens users have unhappily observed suddenly that their lens had become torn. This occurs because in order to place their lenses in the interior of the case and subsequently rinse them in solution, or vice-versa, the natural tendency is for the lens to float. However with any movement or raising of the lens case, the lens rises up to the edge. Being that the colorless lens is held in a solution which is also colorless, the lens position is frequently undetectable at the moment of screwing on the cap to close the lens case. This is how an accident occurs. Therefore, we have an non-utilizable lens and an indignant user who suffers.

Official statistics about this problem do not exist, but in our experience in the field of contact lens distribution, we can confirm that these cases are not rare. All of the involved actors in this field, be they manufacturers, distributors, ophthalmologists, ophthalmologist assistants or users, have had cases relating to torn lenses caused by contact with the edge of a lens case.

Characteristics of the Invention

The present invention arrives as a solution to the problem. Given the way it has been conceived it is impossible that accidents of this nature would reoccur.

The present invention consists of a case to keep contact lens from being torn (fig. 1 and fig. 2).

Each cavity has an internal subdivision, creating two cylindrical chambers, one internal (2), and the other external (4), interconnected through an open space (1) in the internal chamber (2). The internal chamber (2) is higher than the external chamber (4) as if it were two rings of different diameters, one inside the other, with the ring with the smaller diameter (3) being taller than the ring with the larger diameter, and both being part of the same base (6). (fig. 3)

The designs in the annex show the details of the Anti-Damage Contact Lens Case, the subject of the present patent, as follows:

Fig. 1 shows the case from a closed perspective;

Fig. 2 shows it with the caps opened;

Fig. 3 shows it open and tilted;

Fig. 4 shows it open viewed from above;

Fig. 5 shows it cut and open from the side.

The user in the act of storing or cleaning his lens, will place it in the internal chamber (2) and fill the case with solution, and can harmlessly pour into either the internal (2) or external chamber (4) as they are interconnected. Thus, the level of solution will rise equally in both chambers. The importance of this is that overflow will only occur in the external chamber (4) because it is lower then the internal chamber where the lens is kept (2), which due to its greater height, never overflows. Therefore, regardless of whether the case is full of solution and the lens is floating, there is no risk that it can come into contact with the thread (5).

The material in which the container is made includes plastics as resistant as they are non-interfering with

the components of the process, in this case - the solution and the lens. Of these, we favor Polyethylene and Polypropylene amongst the principal ones.

We believe that the container as explained herein, presents itself as the alternative of greatest efficacy for accommodating and securely storing the various types of commercial contact lenses.

Patent Requirements for the model of utility of the Anti-Damage Contact Lens Case

1 - Patent of model of utility of the Anti-Damage Contact Lens Case, characterized by presenting a unique design, with concentric cylinder cavities of different sizes, but conceived to accommodate the same volume of cleaning solution.

2 - Patent of model of utility of the Anti-Damage Contact Lens Case, characterized by a contemplated system of accommodation of cleaning solution with a base of connecting chambers.

3 - Patent of model of utility of the Anti-Damage Contact Lens Case, characterized by the storage of contact lens of different types and applications.

4 - Patent of model of utility of the Anti-Damage Contact Lens Case, characterized by inclusion in its fabrication materials made from a base of synthetic polymers, as example, polyethylene and polypropylene amongst the principal ones.